

Definition of Frame-Invariant Soret Coefficients for Ternary Mixtures †

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The definition of the Soret coefficient of a binary mixture includes a concentration prefactor, $x(1 - x)$ when mol fraction x is used, or $w(1 - w)$ when mass fraction w is used. In this presentation the physical reasons behind this choice are reviewed, emphasizing that the use of these prefactors makes the Soret coefficient invariant upon change in the reference frame, either mass or molar. Then, it will be shown how this invariance property can be extended to ternary mixtures by using an appropriate concentration prefactor in matrix form. The presentation will be completed with some considerations of general non-isothermal diffusion fluxes, binary limits of the concentration triangle, selection of the dependent concentration in a ternary mixture, and, finally, extension to multi-component mixtures.

Reference

1. Ortiz de Zárate, J.M. Definition of frame-invariant thermodiffusion and Soret coefficients for ternary mixtures. *Eur. Phys. J. E* **2019**, *42*, 43.



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